Competency 4.11 **Environmental restoration personnel shall demonstrate a working level knowledge of the training and qualification requirements for defense nuclear facility personnel as described in Department of Energy (DOE) Order 5480.20A, Personnel Selection, Qualification, Training and Staffing Requirements at Department of Energy Reactor and Non-Reactor Nuclear Facilities.**

1. Supporting Knowledge and Skills

a. Describe the five elements of a systematic approach to training.

b. Discuss the relationship between training, risk, and safe facility operations.

c. Discuss key elements of an effective on-the-job training program.

2. Self-Study Activities (corresponding to the intent of the above competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	**Site Location**	**Notes**
Department of Energy	http://wastenot.inel.gov/cted/stdguido.html	DOE Standards, Guides, and Orders
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Review EH Resident study guide 2.19.

Read pages 9 through 15 of DOE-STD-1077-94, U.S. Department of Energy Standard, *Training Accreditation Program Standard: Requirements and Guidelines*.

Read pages xiii through xv, 1-7, 2-1, 3-1, 4-1, 5-1 through 5-4, and 5-6 through 5-9 of *The Occasional Trainer's Handbook.*

EXERCISE 4.11-A Develop a short summary for each of the five phases of the systematic approach to training:

- Analysis
- Design
- Development
- Implementation
- Evaluation

EXERCISE 4.11-B Construct a simple matrix showing the phases of the systematic approach to training by the primary products or outputs from each phase.

Read page 2 of DOE Order 5480.20A, *Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities*.

EXERCISE 4.11-C Using DOE Order 5480.20A, page 5, discuss the relationship between training, risk, and safe facility operations.

Read DOE-STD-1012-92, U.S. Department of Energy Guideline, *Guide to Good Practices for On-the-Job Training*

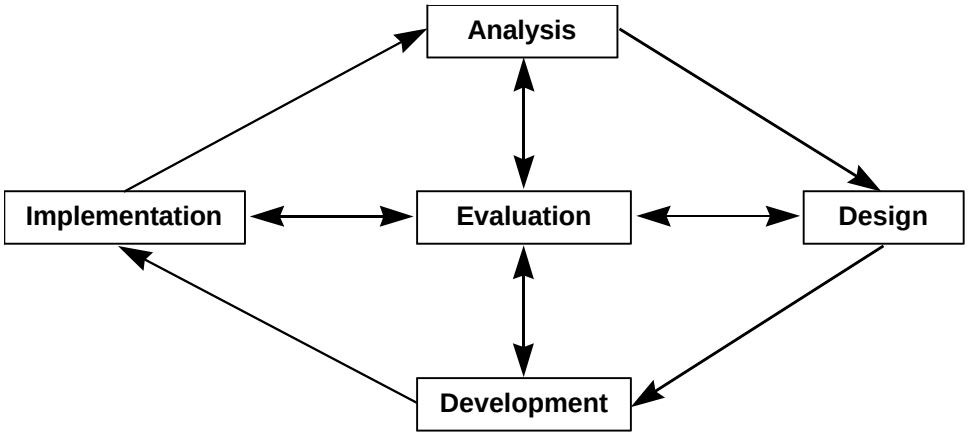
Review example OJT guides shown in Appendix B of DOE-STD-1012-92, U.S. Department of Energy Guideline, *Guide to Good Practices for On-the-Job Training*

EXERCISE 4.11-D What is the primary reason for establishing an OJT program or phase of an existing training program?

EXERCISE 4.11-E Describe the elements of an effective on-the-job training program.

3. Summary

The systematic approach to training includes the following elements: analysis, design, development, implementation, and evaluation. The diagram below shows the relation between each element.



An effective OJT and task performance evaluation process includes the following elements:

- Tasks or objectives selected for skills training
- Standards used in evaluating task performance
- Trainer and evaluator selection, instruction, and guidance
- Training, evaluation, and qualification materials that are accurate and complete
- Program evaluation

The facility's training organization and programs should be evaluated periodically to determine whether they are achieving the established goals and objectives. The effectiveness of training programs to produce qualified personnel should also be evaluated periodically. This should be accomplished by reviewing operating occurrences, interviewing job incumbents and first-line supervisors, observing operations, etc. The results of these evaluations, if used correctly, will help ensure a facility of safe, efficient, and reliable operations.

The following considerations should be emphasized when evaluating training and qualification programs:

- The responsibility for monitoring indicators, analyzing data, and approving revisions is clearly defined.
- The training department is alerted to facility operating, maintenance, and industrial safety experiences.
- Communication on training effectiveness occurs between plant supervisors and the training department.
- Employee opinion of the equality and effectiveness of training is collected periodically.
- The training department is alerted to employee performance errors.
- The training department meets with maintenance and operations supervisors and engineers to determine potential training problems.
- Training uses facility inspection and evaluation reports to guide program revisions.

- Facility modifications and procedure changes are monitored for training consequences.
- Training monitors industry operating and maintenance experiences for program impacts.
- Regulatory changes are reviewed for training consequences.
- Program performance data are analyzed.
- Proposed changes are reviewed by appropriate facility and training personnel.
- Training changes are tracked.

Evaluation of a technical training and qualification program activity typically includes the following criteria, as a minimum:

Criteria	Applications
Are the materials prepared at a level of skills and knowledge appropriate to the trainees?	Determine whether material content can be related to expected entry-level skills and knowledge, including appropriate reading level of the trainees.
Are the materials clearly written and presented so the trainee can complete the required learning activities?	Determine whether selected trainees can use the materials and complete the learning activities.
Do the materials reflect the learning objectives of the desired program?	Assess the material, comparing the learning objectives to those of the desired program, and determine which learning objectives are not covered adequately.
Are the materials consistent with other materials used in the training program or the mastery of the learning objectives?	Analyze sets of materials to determine whether they are supportive and provide an effective progression of learning.
Do the materials conform to the learning activities of the desired program?	Analyze the materials, comparing the learning activities to those of the desired program. Identify any deficiencies.
Are the materials practical for use in the given facility situation?	Determine whether the materials can be used in facilities with available equipment, time, and space, and with the number of trainees planned.

4. Exercise Solutions

EXERCISE 4.11-A Develop a short summary for each of the five phases of the systematic approach to training:

- Analysis
- Design
- Development
- Implementation
- Evaluation

ANSWER 4.11-A Analysis ensures training activities are oriented to job requirements by identifying the specific tasks involved in a given job. Training requirements are determined by analyzing the job and its component tasks. Organizational needs are also assessed to determine the resources required to support identified training requirements.

Design begins with developing terminal and enabling objectives based on information gathered from the analysis phase. Skills and knowledge associated with performing a task well are translated into enabling objectives. The objectives are then organized into instructional units and sequenced to aid the learning process. The objectives become the guides for the development of learning strategies, course content, and training materials. Additional design activities include identifying the appropriate training setting, developing test items and examinations (also done in the next phase), and documenting key components of this phase.

Development is the actual preparation of lesson plans, instructor guides, training aids, and training materials. Formulation of additional enabling objectives and revisions of test items and objectives may also occur. Both technical and instructional reviews of the products are conducted, and changes are made as necessary to ensure the content is both technically and educationally correct and relevant.

Implementation consists of resource allocation, planning, and scheduling, as well as the actual conduct of training. Resource allocation includes assigning instructors and support staff and scheduling training in facilities.

Evaluation is the critical feedback loop to ensure that the training meets its objectives. Feedback from instructors, trainees, evaluators, and supervisors is reviewed for its potential refinement of future training. Evaluation is a continuing action that occurs throughout the entire process and beyond. Evaluation results are translated into change actions or recommendations based on different criteria such as adequacy of content, tests, presentation, or documentation, and post-training job performance.

EXERCISE 4.11-B Construct a simple matrix showing the phases of the systematic approach to training by the primary products or outputs from each phase.

ANSWER 4.11-B As examples:

Phase	Products
Analysis	• Task list for a job or, for example, a new system or equipment • List of job task skills and knowledge • A determined or confirmed training need
Design	• Learning and performance objectives, terminal and enabling objectives • Outline of instruction, including sequence, tentative settings, methods, and media to be used
Development	• Lesson plans • Instructor guides • Trainee guides • Media materials and equipment • Piloting the training course/program
Implementation	• Establishing or setting up the training setting • Instructor training • Instructor preparation and rehearsal • Conduct of the training • Training attendance sheets • Completed trainee examinations • Completed trainee feedback and comment forms

Phase	Products
Evaluation	• Trainee, instructor, and supervisor post-training feedback forms • Post-training testing results • Training program assessments and evaluations • Assessments of how well each phase of the systematic approach process is working

EXERCISE 4.11-C Using DOE Order 5480.20A, page 5, discuss the relationship between training, risk, and safe facility operations.

ANSWER 4.11-C A discussion of training, risk, and safe facility operations is found in the "policy and objectives" statement:

DOE objectives are to ensure the development and implementation of contractor-administered training programs that provide consistent and effective training for personnel at DOE nuclear facilities. This Order contains minimum requirements that must be included in training and qualification programs. The requirements are based on DOE, NRC, and related industry standards, and are applicable to all operable DOE nuclear facilities. Because the operation of Department of Energy reactor and non-reactor nuclear facilities involves certain risks to employees, the public, and the environment, well trained and qualified operating organization personnel are of extreme importance. A vital element in ensuring a well trained and qualified work force is the implementation of a systematic approach to training (SAT). This approach has proven effective in the commercial nuclear power industry and in other major industries; therefore, the Department requires that training programs for personnel in the operating organization at DOE nuclear facilities are established using a systematic approach to training. Experience has also shown that the better operating nuclear facilities have well-defined, effectively administered policies and procedures to control the activities associated with personnel training. This Order requires the establishment and implementation of certain training-related procedures. Implementation of the requirements of this Order will meet 10 CFR 830.120, *Criteria 2-Personnel Training and Qualification*.

EXERCISE 4.11-D What is the primary reason for establishing an OJT program or phase of an existing training program?

ANSWER 4.11-D OJT is typically hands-on, job-related training that promotes learning, retention, and application of the associated skills and knowledge.

EXERCISE 4.11-E Describe the elements of an effective on-the-job training program.

ANSWER 4.11-E On-the-job training is practical hand-on training in which employees achieve learning objectives through training conducted in the job environment. OJT is a formal part of the maintenance training program. This aspect of an individual's training is normally conducted in the facility as part of the day-to-day work activities. Accordingly, maintenance department supervisors and selected experienced craftsmen are directly involved in OJT. Some key elements of OJT are listed below:

- OJT Program Adherence--OJT should be conducted in accordance with formally defined training programs that specifically identify items the trainee must accomplish.
- OJT Trainer Qualification--OJT should be conducted by personnel who have successfully qualified as OJT trainers.
- Trainee Supervision and Control--When trainees perform maintenance on installed equipment, a qualified OJT instructor should observe the work so that the trainee properly accomplishes the activity and understands how to avoid errors that could affect personnel safety or adversely impact the station.
- Number of Trainees--To determine the number of trainees allowed to simultaneously participate in any particular training evolution, the trainer should consider training effectiveness and the effect on the equipment being maintained.
- Trainee Conduct of Maintenance--The maintenance manager should establish a policy that allows trainees to independently perform maintenance only on equipment for which they are qualified.